

### Remarks

Claims 1-13, 15-31, 33, 35-52, 54-58 and 60-69 are pending in the present application. The Examiner has rejected Claims 1-13, 15-31, 33, 35-52, 54-58 and 60-69 under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,609,085 to Uemura.

#### *1. General Comments About Uemura*

Before discussing the specific portions of Uemura cited by the Office Action, some general comments about the Uemura reference and the present invention are appropriate. The present invention is directed to a system and method for searching for remote databases and determining if the remote database found during searching is comprised of time-series data. If a remote database found during searching is determined to be comprised of time-series data, then location information for the database is stored.

Uemura is directed to a system and method of storing, processing and displaying time-series data. The time-series data in Uemura, however, a) is data already known to Uemura's system, and b) is already known to Uemura's system to be time-series data. Indeed, there is substantial disclosure in Uemura about how the time-series data is acquired, namely, by monitoring and acquiring data, via sensors, at predetermined intervals, from multiple continuously operating industrial plants, for example.

#### *2. Uemura Does Not Disclose the Step of **Searching** For At Least One Remote Database*

The Office Action states on p. 2 that Uemura, at col. 1, lines 11-67 to col. 2, lines 1-54, discloses "searching for at least one remote database accessible via a network of computer systems." The cited portion of Uemura, however, which is reproduced in its entirety below, does not disclose searching for a remote database, as required by Claim 1:

## 1. Technical Field

The present invention relates to processing of time series data, represented by trend data and so on, in an industrial plant which is continuously operated, more specifically to storage of data into a recording medium, expansion of data to a memory, data transfer through a network, a method for storing time series data in reading out and displaying data, time series data base system, a method for processing time series data, a system of processing time series data, a system of displaying time series data, a medium recording the time series data or a program for processing the time series data.

## 2. Background Art

Conventionally, in an industrial plant, data exhibiting operating conditions of the plant are acquired by each predetermined time, a large amount of series data are then accumulated in a data base, and a trend (tendency, transition) of the time series data is displayed and analyzed. A system of displaying the trend having a function of on-line displaying such a trend of the time series data, herein below, referred to as trend data, is proposed in various manners and utilized in various situations.

In the conventional system, when the time series data are stored, as illustrated in FIG. 40, time series data  $a_1, a_2, a_3, \dots$ , are at each sampling period  $\Delta T_0$  are directly stored in serial according to a time schedule, or the time series data are subdivided into files having a predetermined size and then stored. According to such methods of storing data, there was a problem that a process of picking requisite data out and displaying trend data becomes very complicated when a large amount of data were stored for a long time.

For example, provided that items of data and the amount of data became large, it became difficult to select and pick out data to be displayed belonging to a target item and a target period among the large amount of data. Further, when it was tried to display trend data in a long term scale such as an order of year, it took a long time for displaying data or was impossible to display the data because the amount of data to be read out was excessively large.

As described, in accordance with the conventional methods of storing time series data illustrated in FIGS. 40 and 41, because the time series data at sampling periods  $\Delta T_0$  were sequentially read out in response to various requirements of reading out data for displaying various trend data, there was a problem that a long time was necessary to read out and display the data. For example, in case that data stored for an extremely long period were required to be read out at a sampling period  $\Delta T_L$  longer than  $\Delta T_0$ , it was necessary to read all data belonging to the required period by the shortest sampling period  $\Delta T_0$  and pick out the data by making the sampling period  $\Delta T_L$ . Therefore, there were problems such that troubles were occurred in reading out useless data and picking out the data; a process for displaying was extremely inefficient; and a requirement of processing at a high speed was not satisfied.

It is desired to minimize the amount of data to be treated, efficiently process, and conduct processes of accessing time series data at a high speed in case that the time series data are stored in a recording medium, the time series data are read out and expanded into a

memory, and the time series data are transferred through a network.

Further, in case of a monitoring system which monitors by displaying various trend data of a plant, when, for example, the number of plants was increased or the plants existed in wide areas so as to extend a requirement of reading out the data to a plurality of plants, there were problems that data were acquired from the respective plants, a structure of system was complicated, and a process was complicated.

In order to read such trend data of the plurality of plants out and monitor at a single location, there is a case that a structure of data base system, which concentrates data of a plurality of groups corresponding to all plants on a single host device and accumulates and stores these, is used. In such a system, there were problems such that a high cost device with a high performance was necessary to deal with a load concentrated on the single host device and data of all of the plants were unable to read out when a trouble occurred in the host device. Even in a case that the data could be read out, in the conventional system, processes of instantaneously reading requisite data from the data of the plurality of groups from the different plants and immediately displaying a trend of data belonging to a date and a time desired by a user in a desired scale were complicated and occasionally impossible.

The present invention is provided in consideration of the above-mentioned circumstances. A first object is to provide a method for storing time series data, a time series data base system, a system for displaying time series data, and a recording medium in which time series data are recorded, which enable to efficiently execute a process of reading out requisite data at a high speed when a large amount of data are stored.

A second object of the present invention is to provide a method for processing time series data, a system of processing time series data, and a recording medium in which the time series data or a program for processing the time series data is recorded, which enable to efficiently execute processes concerning storage, read-out, transfer and so on of data without increasing the amount of data to be treated when a large amount of series data are processed.

A third object of the present invention is to provide a time series data base system and a method for processing time series data, which enable to efficiently and freely read out requisite time series data among a large amount of time series data included in a plurality of groups.

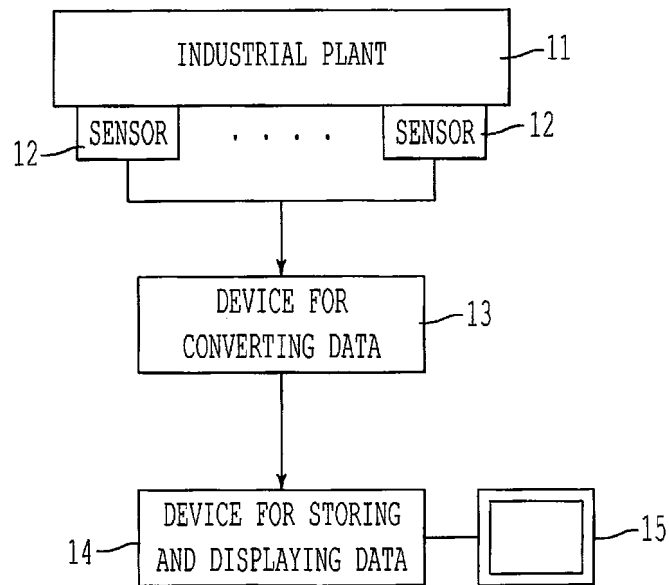
A fourth object of the present invention is to provide a system for displaying time series data and a method for processing time series data, which enable to easily display a trend of a plurality of time series data in a form desired by a user at a high speed.

Again, the above-cited portion of Uemura does not disclose "searching for at least one remote database." Indeed, there is no disclosure whatsoever in Uemura about searching for databases,

remote or otherwise. Uemura is not concerned at all with searching for remote databases; rather, Uemura is concerned exclusively with efficiently storing, processing and displaying large amounts of data, for example, data relating to the operations of multiple industrial plants, the price of a stock or the price of a commodity. The data stored, processed and displayed by Uemura's system relates to a continuously operating industrial plant, which is already known to Uemura's system. The data stored, processed and displayed by Uemura is acquired via sampling of data, from the plurality of industrial plants at predetermined time intervals, for example:

Conventionally, in an industrial plant, data exhibiting operating conditions of the plant are acquired by each predetermined time, a large amount of series data are then accumulated in a data base, and a trend (tendency, transition) of the time series data is displayed and analyzed.

See Col. 1, lines 23-28 (emphasis added). Figure 4, which is reproduced below, and the accompanying description further discusses Uemura how the data is acquired via sensors follows:



**FIG. 4**

FIG. 4 illustrates a first structure of the trend display system, wherein a system of displaying trend data in graphs utilized in an industrial plant such as a glass kiln will be described as an example.

The trend display system comprises a sensor 12 for detecting values representing various operational conditions such as temperatures and flow rates in various portions in an industrial plant 11, a device for converting data 13 which converts measured values detected by the sensor 12 into digital data, a device for storing and displaying trend data 14 which inputs the measured data sent from the device for converting data 13 in time series, hierarchically stores the time series data in a recording medium, reads the time series data stored in response to a requirement of a user out of the recording medium, and outputs to display, and a monitor 15 as a display means which displays trend data outputted from the device for storing and displaying trend data 14 in a screen.

Thus, the data stored, processed and displayed by Uemura was acquired by Uemura's system and is already known to Uemura's system. There is no need, therefore, to search for a database, remote or otherwise.

3. *Uemura Does Not Disclose the Step of **Determining** Whether Each Remote Database Found During The Searching Is Comprised of Time Series Data*

The Office Action states on pp. 2-3 that Uemura, at col. 16, lines 1-21, col. 29, lines 24-38, col. 31, lines 12-35 discloses "determining whether each remote database found during the searching is comprised of the desired type of data, wherein the desired type of data is time series data." The cited portions of Uemura, however, which are reproduced in their entirety below, do not disclose determining whether a remote database is comprised of time series data, as required by Claim 1:

In case such that a user analyzes trend data using a system of displaying trend, a method for searching data in an object time is to hierarchically search data while initially grasps an outline of trend by displaying coarse trend data in a long time scale and gradually or once selecting and switching a displaying time and an accuracy of displaying in reference of portions to be noticed for displaying trend data in a desirable time period and time scale. In use of such a method for searching, natural control feeling is obtainable for a user and, for example, workability for analyzing can be improved. In case that this operation of searching data is conducted, because time series data at various sampling periods corresponding to different time scales can be efficiently read out and displayed, it is possible to display trend at a high speed while searching desirable time series data.

\* \* \*

In the system for monitoring plant data according to this embodiment, the terminal for monitoring trend data 240 has a function of a means for displaying plural, and it is possible to independently and simultaneously display a plurality of screens of trend graph. FIG. 34 illustrates an example of processing to display trend data separately in a plurality of trend graphs for enabling to simultaneously compare these.

When a user selects desirable tag information out of the list of tag information 255 and operates to drag and drop on the screen of trend graph 254 by a plurality of times, a plurality of trend graphs 256a, 256b are displayed as independent graphs on the screen of trend graph 254. At this time, by independently executing a process of reading out trend data illustrated in FIGS. 28 and 29 by a plurality of times, it is possible to independently read out the plurality of trend data and making independently display the respective trend graphs 256a and 256b.

\* \* \*

As described, in the system of displaying time series data according to this embodiment, it is possible to search and read out desirable data out of a great amount of time series data of a plurality of plant, instantaneously call trend data of different plants and simultaneously display to analyze, display trend of a past and the present of arbitrary data, and display in various time scales from a unit of second to a unit of year, whereby a user can analyze by efficiently and instantaneously displaying in various modes required by the user. Especially, in use of a method for hierarchically storing time series data described in First or Second Embodiment, it is possible to demonstrate a further high speed and further efficiency in processing to read out data.

For example, conventionally, it was very troublesome and impossible in a short time to compare time series data of analogous plants in remote locations and technically analyze. On the other hand, in these embodiments, trend data can be read out on a screen of monitor of a terminal through a network and simultaneously display even though the trend data are for a remote location, whereby it is possible to very efficiently and easily compare to analyze the trend data. Further, it is also possible to conduct a substantially real-time analyzation at a single location by a specialized technician for trend data of a plurality of plants including those located in remote locations.

Applicant respectfully asserts that the above-cited portions of Uemura are not entirely clear.

Nonetheless, to the extent that Applicant understands that above cited portions of Uemura, it does not disclose determining whether a remote database found during searching is comprised of time-series data. Indeed, as discussed in detail above, it is clear that Uemura's system stores,

processes and displays data that was acquired by Uemura's system and is already known to be time-series data. Thus, Uemura does not need to determine whether the data stored, processed and displayed by Uemura's system is time-series data.

4. *Uemura Does Not Disclose The Step Of Storing Location Information For Each Remote Database Found During Search If The Remote Database Is Comprised Of The Desired Type Of Data.*

The Office Action also asserts that Uemura discloses the step of storing location information for each remote database found during search if the remote database is comprised of the desired type of data. Office Action at 3. To support this assertion the Office Action cites col. 16, lines 1-21, col. 29, lines 24-38, col. 31, lines 12-35. The entirety of the cited portion has already been reproduced above. It is simply a mischaracterization of the reference to assert that this portion of Uemura discloses "storing *location information for each remote database found during searching.*" The cited portion of Uemura simply discusses analyzing data a "single location" for a plurality of plants in "remote locations." There is no discussion of storing *location information* for a database, remote or otherwise.

To summarize, Uemura does not disclose each and every element of Claim 1. Indeed, Uemura does not disclose any of the elements of Claim 1. Rather, Uemura discloses a system and method for storing, processing and displaying data. Uemura has no disclosure whatsoever of searching for at least one remote database accessible via a network of computer systems, determining whether each remote database found during the searching is comprised of the desired type of data, wherein the desired type of data is time series data, and storing location information for each remote database found during the searching if the remote database is comprised of the desired type of data.

Claims 2-13, 15-31, 33, 35-48 all depend on Claim 1 and are allowable because Claim 1 is allowable.

Applicant notes that for each of claims 2-13, 15-31, 33, 35-52, 54-58 and 60-69, the Office Action cites the exact same portions of Uemura, namely, col. 16, lines 1-21, col. 29, lines 24-38, col. 31, lines 12-35, to support the assertion that each and every limitation of these claims are disclosed by the exact same portions of Uemura. Suffice it to say, Applicant disagrees.

With respect to independent Claim 49, Uemura does not disclose a computer-implemented method of identifying one or more remote databases that contain a desired type of data that includes the step of storing an indication of whether each remote database found during the searching is comprised of the desired type of data, wherein the desired type of data is time series data.

With respect to Claim 50, Uemura does not disclose a memory for storing information relating to at least one remote database accessible via a network of computer systems, the at least one remote database being comprised of a desired type of data, the memory comprising a data structure that includes location information for at least one remote database, the location information being stored if the at least one remote database is comprised of the desired type of data, wherein the desired type of data is time series data. Claims 51-52, 54-58 and 60-67 all depend on Claim 50 and are allowable because Claim 50 is allowable.

Independent Claim 68 is directed to a computer readable media comprising software for instructing a computer system to determine whether each remote database found during the searching is comprised of the desired type of data, wherein the desired type of data is time series data. Claim 68, therefore, is allowable over the cited prior art for the same reasons that Claim 1 is allowable. In addition, Uemura does not disclose a computer readable medium comprising



software for instructing a computer to determine whether each remote database found during the searching is comprised of the desired type of data, wherein the desired type of data is time series data.

With respect to Claim 69, Uemura does not disclose a computerized apparatus for locating one or more remote databases containing a desired type of data wherein location information is stored in a computer if a remote database is comprised of the desired type of data, wherein the desired type of data is time series data.

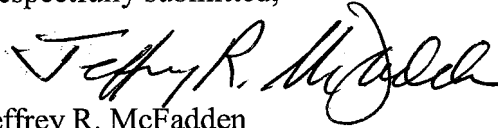
Certain of the claims that depend on Claims 1 and 50 are allowable for the following additional reasons. With respect to Claim 38-40, the cited passages from Uemura do not disclose the steps of determining whether the time series of data is redundant of a series of data for which information has already been stored (Claim 38), not storing information about the time series of data if the time series of data is redundant of a series of data for which information has already been stored (Claim 39), and storing information about the time series of data if the time series of data is not redundant of a series of data for which information has already been stored (Claim 40).

With respect to Claim 41, the cited passages of Uemura do not disclose the steps of “determining whether a correlation exists between at least some of the data of the desired type contained in the at least one remote database and at least some of the data of the desired type contained in a predefined data set, and if the correlation exists, storing an indication of the correlation in association with the stored location information for the at least one remote database.”

It is submitted that this Reply addresses all issues and overcome all rejections of the outstanding Office Action, and that the present application has been placed in condition for

allowance. Applicant courteously requests early indication of allowance of the present case, including all pending claims 1-13, 15-31, 33, 35-52, 54-58 and 60-69. If any issue remains unresolved, Applicant's counsel would appreciate the opportunity for a telephone interview to expedite allowance.

Respectfully submitted,



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